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EXAMINER

GOLDEN, JAMES R

ART UNIT PAPER NUMBER

2187

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/648,201

Applicant(s)

CHEN ET AL.

Examiner

James Golden

Art Unit

2187

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

The instant application having Application Number 10/648201 has a total of 7 claims pending; there are 1 independent and 6 dependent claims, all of which are ready for examination by the examiner.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference characters not mentioned in the description: 1184a and 1184b of Fig. 3. These are labeled "parameter lists," and are referenced in the specification as "1084a ~ 1084n" (page 8, lines 3-4).

3. The drawings are objected to because 1082 of Fig. 3 should presumably be corrected to read --Data Compression Circuit.--

4. The drawings are objected to because Figs. 4 and 5A are referred to as "flowcharts of the optimal compression management mechanism used in a preferred embodiment of the invention" (page 9, lines 9-11), when actually Figs. 5A and 5B are the flowcharts.

5. The drawings are objected to because the flow arrows of Figs. 5A and 5B are indistinguishable from the other connections. They should be changed to much thicker lines or to dotted lines.

6. Figure 6 should be designated as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

7. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the connections of the processor to other elements must be shown or the features canceled from the claims. No new matter should be entered.

8. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

9. Applicant is reminded of the proper language and format for an abstract of the disclosure. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. Appropriate correction is required.

10. The disclosure is objected to because of the following informalities: the meaning of the first sentence on page 2 is unclear; "waters" should be corrected to --wafers-- (page 2, line 2); "high" should be corrected to --higher-- (page 2, line 21); "can't" should be corrected to --cannot-- (page 2, line 27); "age" should be corrected to --stages-- or something similar (page 3, line 1); "till" should be corrected to --until-- (page 3, line 15); "achieve higher transmission rate" should be corrected to --achieve a higher transmission rate-- (page 3, line 20); "it is urgent task" should be corrected to --it is an urgent task-- (page 3, line 21); "not only storage function" should be corrected to --not only the storage function-- (page 3, line 22); "medium" should be corrected to --media-- (page 3, line 27); "with optimal" should be corrected to --with an optimal-- (page 4, line 10); "communicates said" should be corrected to --communicates with said-- (page 4, line 20); "there is" should be removed (page 4, line 21); "multi times of the raw data" should be corrected to --multiple times the size of the original data-- (page 6, line 24); "raw data" should be removed (page 7, line 10); "store" should be corrected to --stores-- (page 7, line 18); "a reserved area as" should be removed (page 7, line 25); "microprocessor 102 reads" should be corrected to --microprocessor 102 and reads-- (page 9, line 3); "read" should be corrected to --reads-- (page 10, line 16).

Appropriate correction is required.

Claim Objections

11. Claim 1 is objected to because of the following informalities: --an-- should precede "optimal compression management mechanism" (line 1); "distinguish" should be corrected to --distinguishes--, line 18); "choose" should be corrected to --chooses-- (line 19). Appropriate correction is required.

12. Claim 5 is objected to because of the following informalities: claim 5 recites the limitation "the second data cache" in line 3. It should be noted that this claim is only dependent on claim 1, and therefore no first data cache is implied by "the second data cache."

Claim Rejections - 35 USC § 112

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. **Claims 4 and 5** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

15. **Claim 4** recites the limitation "the first data cache" in line 3. There is insufficient antecedent basis for this limitation in the claim. This rejection could be overcome by correcting this phrase to read --a first data cache line.--

16. **Claim 5** recites the limitation "the second data cache" in 3. There is insufficient antecedent basis for this limitation in the claim. This rejection could be overcome by correcting this phrase to read --a second data cache line.--

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. **Claims 1-3 and 6-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Dye (US 6,145,069) in view of Chu (US 5,374,916).

19. **With respect to claim 1**, Dye discloses a storage device comprising

- a controller (200 of Fig. 3) and
- at least a solid-state storage medium (100 of Fig. 3);
- said controller has an internal system interface that may be connected to an external system end (180 of Fig. 3), a microprocessor that processes system instructions (400 of Fig. 3), and memory interface that communicates with said solid-state storage medium (120 of Fig. 3);
- wherein said storage device is featured with: a data compression/decompression module is devised between said system interface and said memory interface (120 of Fig. 3); said data compression/decompression module is wired to said microprocessor (indirectly through Bus I/F 180 of Fig. 3) and has a data compression circuit (260 of Fig. 3).
- After compression, the circuit stores the compressed data into said solid-state storage medium (column 10, lines 1-3; column 10, lines 8-11).

Dye does not disclose the following limitations: said data compression/decompression module having a plurality of algorithm definitions and parameter lists that are used with said data compression circuit; said microprocessor distinguishes the type of the raw data transferred from the system interface and chooses the most suitable compression combination from said algorithm definitions and parameters; said data compression circuit compresses raw data into minimized data volume according to said compression combination.

Chu discloses

- said data compression/decompression module having a plurality of algorithm definitions (column 4, lines 48-60) and parameter lists (column 6, lines 43-49) that are used with said data compression circuit;
- said microprocessor ("computer-implemented" process, as in column 8, line 46; column 9, line 14; column 9, lines 54-55; column 10, line 16) distinguishes the type of the raw data transferred from the system interface (column 4, lines 46-47; column 8, lines 42-56; column 9, lines 10-25; column 9, lines 47-59 – column 10, lines 1-7; column 10, lines 14-34) and chooses the most suitable compression combination from said algorithm definitions and parameters (column 4, lines 64-69 – column 5, line 1; column 5, lines 8-13; column 6, lines 20-25);
- said data compression circuit compresses raw data into minimized data volume according to said compression combination (column 6, lines 62-69).

Dye and Chu are analogous art because they are from the same field of endeavor, namely data compression and storage.

At the time of invention, it would have been obvious for a person of ordinary skill in the art to combine Chu's optimal compression/decompression system with Dye's compression/decompression controller. The motivation for applying Chu's module with a plurality of algorithm definitions and parameter lists to Dye's compression controller and the motivation for having said microprocessor distinguish the type of raw data transferred from the system interface and choose the most suitable compression combination would have been because "for each data type, one or more data compression techniques can be identified which will provide an optimal data compression ratio according to that data type," (column 1, lines 46-48). The motivation for having the compression circuit compress raw data to at a maximum compression ratio (equivalent to "minimized data volume," claim 1, line 22) would have been "for a variety of portable electronic products... with less electronic memory available, having an efficient data compression method is even more critical... if these devices are to achieve the comparable operation of a larger electronic system" (column 1, lines 24-32). Therefore, it would have been obvious to combine Chu with Dye for the benefit of a data compression/decompression system that compresses and stores data with a maximum compression ratio (or "minimized data volume") according to the type of data to obtain the invention as specified in claim 1.

20. **Claim 2** further distinguishes over the teaching of Dye by the limitation wherein said solid-state storage medium stores indexes referring to the optimal algorithm definition and parameter list.

Chu teaches the limitation wherein said solid-state storage medium stores indexes referring to the optimal algorithm definition and parameter list (column 7, lines 24-29).

Dye and Chu are analogous art because they are from the same field of endeavor, namely data compression and storage.

At the time of invention, it would have been obvious for a person of ordinary skill in the art to combine Chu's indexes referring to the optimal algorithm definition and parameter list with Dye's compression/decompression controller. The motivation for doing so would have been because "a first data decompression process then processes the compressed data using the selected [Huffman code] lookup table to generate a first set of decompressed data" (column 7, lines 29-32) and "a second data decompression process then processes the first set of decompressed data using the selected LZ type decompression codebook to provide as output an expanded original data stream" (column 7, lines 32-34); the indexes are used to decompress the data, which is an necessary function of a data compression/decompression system.

21. **Claim 3** further distinguishes over the teaching of Dye by the following limitations: the storage device with optimal compression management mechanism as in claim 2, wherein said data compression/decompression module further has a data decompression circuit, which is triggered by the microprocessor to read said indexes

from the solid-state storage medium and decompress the compressed data into raw data according to the algorithm definition and parameter list referred by the indexes.

Chu teaches the further limitations, wherein

- said data compression/decompression module further has a data decompression circuit (112 of Fig. 7),
- which is triggered by the microprocessor to read said indexes from the solid-state storage medium and decompress the compressed data into raw data according to the algorithm definition and parameter list referred by the indexes (Chu, column 7, lines 24-29).

See above paragraph 20 for why Dye and Chu are analogous art and why it would have been obvious to combine Chu's indexes with Dye's compression/decompression controller.

22. **With respect to claim 6**, Dye discloses the limitation wherein said data compression/decompression module is devised in said controller (200 of Fig. 3, CEFMC or Compression Enhanced Flash Memory Controller).

23. **Claim 7** further distinguishes over the teaching of Dye as described in paragraph 15 by the limitation wherein said microprocessor distinguishes the type of the raw data on the basis of the distribution of binary bits in the raw data.

Chu teaches the limitation wherein said microprocessor distinguishes the type of the raw data on the basis of the distribution of binary bits in the raw data (column 5, lines 29-32 state "data type identification process 114 detects whether each byte of input data stream 101 corresponds to a decimal equivalent value of greater than 127,"

and the calculation of the decimal value of a byte inherently requires an examination of the distribution of binary bits in the raw data).

Dye and Chu are analogous art because they are from the same field of endeavor, namely data compression and storage.

The motivation for combining Chu's data type identification with Dye's compression/decompression controller is discussed in paragraph 19 above. The method for data type identification discussed in claim 7 is inherent, because any data type identification requires an examination of the distribution of binary bits in the raw data.

24. **Claims 4 and 5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Dye (US 6,145,069) in view of Chu (US 5,374,916) as applied to claims 1-3 and 6-7 above, and further in view of Pattisam et al. (US 5,357,614).

25. **Claim 4** further distinguishes over the teachings of Dye and Chu with the limitation wherein said storage device has the first data cache wired to said system interface, said microprocessor and said data compression/decompression module.

Pattisam et al. disclose the limitation wherein said storage device has the first data cache (according to applicant's Detailed Description, page 6, line 14, "said data caches are used to store data temporarily," which equates them to buffers, as in 211 of Fig. 3) wired to said system interface (through 206 of Fig. 3), said microprocessor (indirect connection between 211 and 230 through 216 of Fig. 3), and said data compression/decompression module (connection between 211 and 220 of Fig. 3).

Pattisam, Dye and Chu are analogous art because they are from the same field of endeavor, namely data compression and storage.

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the compression/decompression systems of Dye and Chu with the uncompressed data buffer of Pattisam et al. The motivation for doing so would have been because "These added components [a microprocessor 230, uncompressed and compressed buffers 210, 211, 250 and flash memory 240] provide an independent on-board capability which... closely monitors and controls the flow of data through the compression coprocessor to provide a consistent high speed throughput of data" (column 11, lines 45-52). Therefore, it would have been obvious to combine Pattisam et al. with Dye and Chu for the benefit of a data compression/decompression system with a first data cache to obtain the invention as specified in claim 4.

26. **Claim 5** further distinguishes over the teachings of Dye and Chu with the limitation wherein said storage device has the second data cache wired to said system interface, said microprocessor and said data compression/decompression module.

Pattisam et al. disclose the limitation wherein said storage device has the second data cache (according to applicant's Detailed Description, page 6, line 14, "said data caches are used to store data temporarily," which is equates them to buffers, as in 250 of Fig. 3) wired to said system interface (indirectly through 229, 212 and 206 of Fig. 3), said microprocessor (connection between 250 to 230), and said data compression/decompression module (connection between 250 and 220 of Fig. 3).

See above paragraph 25 for why Dye, Chu and Pattisam et al. are analogous art and why it would it would have been obvious to combine Pattisam et al. with Dye and Chu for the benefit of a data compression/decompression system with a second data cache to obtain the invention as specified in claim 5.

Status of Claims in the Application

27. Claims rejected in the application: 1-7. Per the instant office action, claims 1-7 have received a first action on the merits and are the subject of a first action non-final.

Conclusion

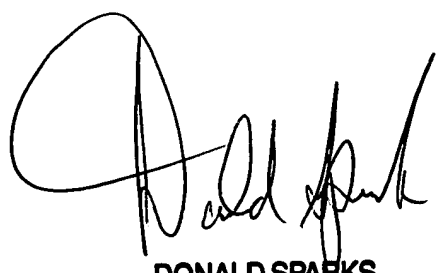
28. The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure. The following references teach a data compression system of similar design:

- US 6,847,315 teaches a compressed main memory with multiple caches for the compression controller;
- US 2003/0090397 teaches a compression controller with multiple compression methods where a piece of data is compressed by every method at first, and then sizes compressed data pieces from different methods are compared to choose optimum method before the rest of the data is compressed;
- US 2003/0058873 teaches a compression/decompression controller for networks.

29. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Golden whose telephone number is 571-272-5628. The examiner can normally be reached on Monday-Friday, 8:30 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571-272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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